Ownership Manual

Bioenergy

Study assesses four primary ownership models for biofuels

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Editor's note: This article presents findings of Informa Economics, a consulting firm headquartered in Memphis, Tenn. The article does not reflect any official position of the U.S. Department of Agriculture or of any other government entity.

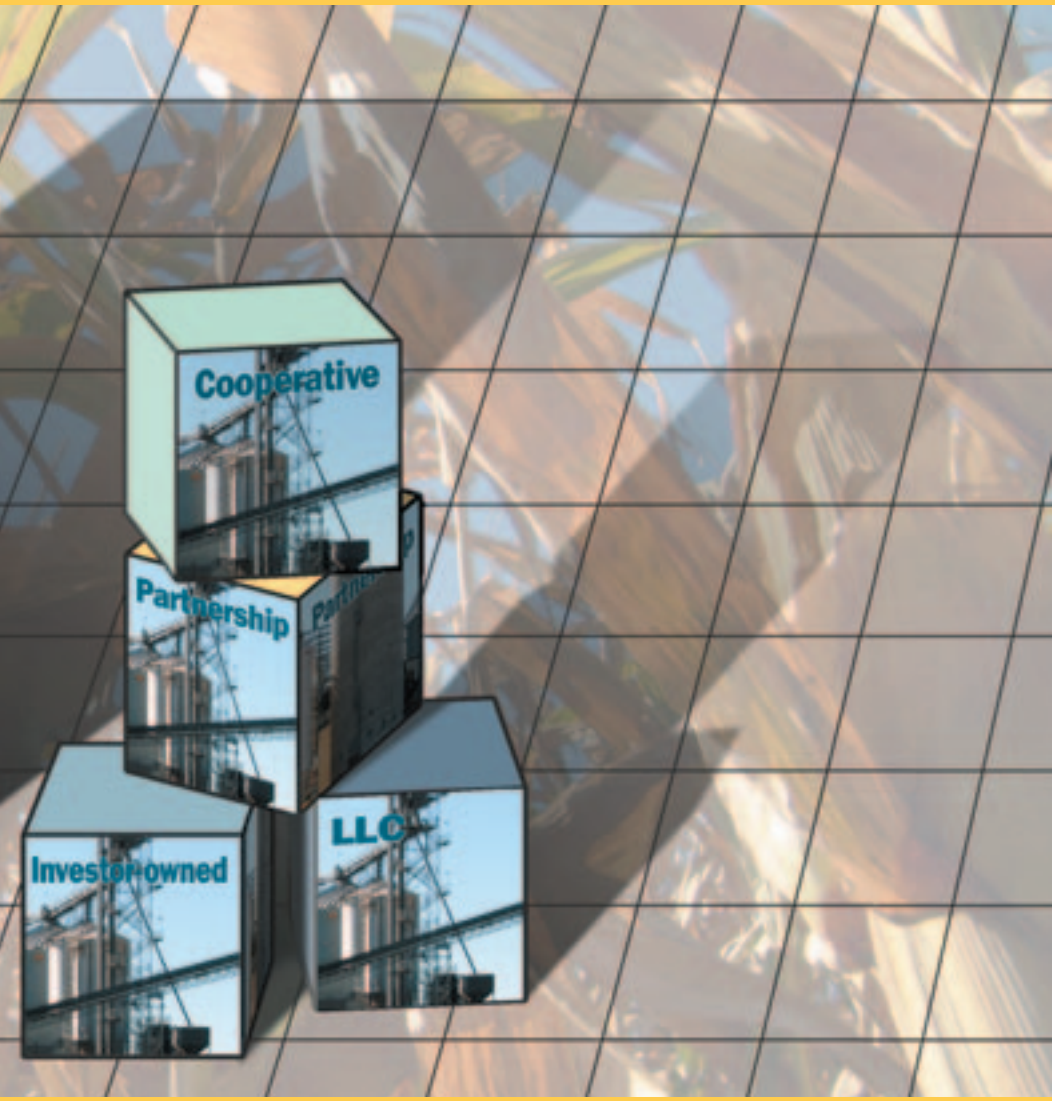
The U.S. Department of Agriculture commissioned Informa Economics Inc. to study the business models in use in the renewable transportation fuels industry. In addition to providing a full description of the basic business models used in biofuels production, the objectives of the study were to:

- Articulate the advantages and disadvantages of each model and the conditions of the marketplace products and raw materials, sources of capital and regulatory and tax environment that most favor use of each particular model;
- Assess public policy and USDA Rural Development programs to align particular models to conditions best suited to promote energy development.

Industry background, structure

The ethanol industry is by far the largest component of the renewable transportation fuels sector, with 3.9 billion gallons produced in 2005 and an estimated 4.9 billion gallons in 2006. This represents dramatic growth from 1990, when production was 900 million gallons, and 2000, when production was 1.6 billion gallons.

During the current decade, ethanol industry growth has been accelerated by a rise in petroleum prices and the banning of the competing oxygenate methyl tertiary butyl ether (MTBE). Farmer-owned facilities participated in this growth to a greater extent than ever. As of November 2006, farmers and other rural investors owned 50 out of the 107 operating ethanol facilities, or 37 percent of production capacity, and they participated significantly in the



USDA photo illustration by Stephen Thompson

industry's high profit margins.

About half of industry capacity is in the hands of firms structured as either a limited liability company or partnership (LLC and LLP) or a cooperative. The other half of the industry is controlled by investor-owned corporations, such as Archer Daniels Midland, which owns 20 percent of the industry's production capacity. Another 30 percent is owned by privately held corporations, such as Cargill and Abengoa Bioenergy.

Business models for biofuels

While a number of diverse business structures developed in the ethanol industry in the past 15 years, looking at a cross-section of the industry, with respect to producer and capacity, reveals these four main business model types:

■ Corporate Model

The producer here is a corporation (typically a Class-C corporation) or a subsidiary of a corporation. Internal staff manages the plant(s) and the functions of grain procurement, biofuels marketing and co-product marketing. The producer does not own or manage farmland. If the corporation produces biodiesel, it is very likely to own integrated oilseed-crushing operations. Some corporations also provide third-party grain supply and biofuel and co-product marketing services to other producers.

Archer Daniels Midland (ADM) is a prime example of this model of ownership. It is a vertically integrated agribusiness conglomerate and is also the largest biofuel producer in both the United States and the world, with more than 1 billion gallons of annual production capacity (although a pending deal may result in a company that surpasses its production, see below). The corporation owns an extensive network of grain elevators and is one of the world's largest agricultural processors of soybeans, corn, wheat and cocoa.

ADM is a Delaware corporation and its stock is listed on the New York Stock Exchange. With net sales and other operating income of $36.6 billion in fiscal 2006, ADM is the largest example of the corporate business model for biofuels. It operates seven ethanol production facilities: Decatur and Peoria, Ill.; Cedar Rapids and Clinton, Iowa; Columbus, Neb.; Marshall, Minn.; and Walhalla, N.D. It is building two new 275-million-gallon plants at its Cedar Rapids and Columbus sites.

ADM has an experienced internal sales force to market its ethanol. It began offering ethanol-marketing services to independent ethanol producers last year. The corporation controls substantial transportation assets, including 20,000 railcars, 2,000 barges and 1,500 tractor trailers. It has co-product merchandising capability via its ADM Alliance Nutrition subsidiary. "ADM is uniquely positioned at the intersection of the world's increasing demands for both food and fuel," says ADM Chief Executive Officer Patricia Woertz.

■ The Farmer-Owned Model

These businesses are generally structured legally as either a cooperative or an LLC or similar organization. Farmers have a majority ownership in the facility. In a co-op, or a co-op within an LLC or which owns an LLC,

members have delivery obligations (grain and/or oilseeds) to the facility. They have access to storage, including on-farm bins and limited storage at the facility. Especially if the ownership is through a cooperative, the business will also have separate grain-elevator operations.

The Chippewa Valley Agrafuels Cooperative (CVAC) is an example of the farmer-owned business model. It was formed in the early 1990s with the intent of establishing an ethanol facility in Benson, Minn. CVAC was formed with more than 650 shareholders, which included producers, elevators and local investors. Planning for the ethanol plant began in 1993. CVAC teamed up (with) the design/builder Delta-T Corporation to form Chippewa Valley Ethanol Co. LLC (CVEC). Delta-T chose to become an equity investor when local producers faced a significant shortfall in their original equity drive.

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CVEC's original capacity was 15 million gallons, and was later expanded to 20 million gallons. As the size of new ethanol plants increased, CVEC expanded again, to 45 million gallons in 2003, in order to stay competitive. In late 2006, CVEC signed a letter of intent with Fagen Inc. to build a new 40-million-gallon facility next to the existing facility.

To improve its market position and diversify its revenue stream, CVEC and a group of other ethanol producers founded Renewable Products Marketing Group. RPMG was established to collectively and cost-effectively market ethanol by aggregating sales in volumes demanded by buyers. RPMG members also used their combined buying power to reduce costs of enzymes and other raw materials.

CVEC teamed up with Pete's Wicked Ale in 2003 to produce Shakers Original American Vodka, a premium brand. CVEC has proven that the farmer-owned business model can be adaptive and progressive and that it can offer business strengths that go well beyond an assured grain supply.

Renewable energy issues focus of WIREC 2008

The Washington International Renewable Energy Conference (WIREC 2008) will bring together government, civil society and private business leaders to address the opportunities and challenges of a major and rapid scale-up in the global deployment of renewable energy technology. The conference will be held March 4-6 at the Washington, D.C., Convention Center.

"Renewable energy can quite literally change the centers of power from urban cities to rural communities," Thomas C. Dorr, USDA Under Secretary for Rural Development, recently said. "It is not often that you have the chance to get in on the ground floor of this kind of development, but that is the opportunity we are being presented with today. WIREC 2008 will bring together government, business and community leaders from around the world to discuss issues, share successes and identify best practices."

WIREC participants can expect to:

- Acquire a better understanding of the benefits of renewable energy deployment on energy security, climate change, air quality and economic growth.
- Gain an appreciation for the multiple policy options and best practices that encourage and enable accelerated renewable energy up-take.
- Develop networks and find partners with whom to explore and initiate renewable energy projects.

These three objectives will be woven into WIREC's four cross-cutting and policy driven themes: Agriculture and Rural Development; Technology/Research and Development; Finance; and Market Adoption/Deployment.

For more information and to register: www.wirec2008.gov, or (805) 290-1338.

■ Engineer/Builder-Owned Model

These firms either own facilities outright or maintain a significant ownership interest, along with other investors, in individual plants. In either case, the design/build firms maintain a controlling interest in management. Because of their ownership in multiple facilities, these firms have the scale to support an internal staff that conducts grain procurement and biofuels/co-product marketing. They may also provide services to unaffiliated plants.

From the Broin family's small-scale entry into the ethanol industry in the 1980s, it would have been difficult to predict the extensive role that the Broin Companies now play across the ethanol-supply chain today. The family built a small plant on its farm in Kenyon, Minn., in 1983. The Broins then purchased and refurbished a foreclosed ethanol plant in Scotland, S.D., in 1987.

From such small beginnings, Broin & Associates began providing ethanol facility engineering and construction services for other organizations. By the end of the 1990s, Broin Companies provided a range of services to ethanol producers and became the prototype engineer-owned business model. Renamed POET in May 2007, this group of companies provides a comprehensive array of services for

Elements of a Business Model

4 Pillars	9 Building blocks	Answer these important questions.
Products	Value proposition	What products are made? What services are performed?
Customers	Target customer	What customer or segment is offered value?
	Distribution channel	By what means is value (products/services) offered?
	Customer relationships	What links the company with its customers?
Operational	Value configuration	How are activities and resources arranged?
Architecture	Core competencies	What competencies are involved in executing the business?
	Commercial partnerships	What arrangements with other businesses are necessary?
Finances	Cost structure	What are the monetary ways and means?
	Revenue streams	How does the company make money?

Adapted from Ostenwalder, A. Pigneur and C. Tucci, "Clarifying Business Models: Origins, Present, and Future of the Concept," *Communications of the Association for Information Systems*, vol. 15, May 2005.

ethanol producers. In 1991, it began operating a center for plant design, engineering, construction and research. A management company was formed in 1994 to provide management services for Broin-designed plants. Dakota Gold Marketing was established in 1995 to market Dakota Gold Enhanced Nutrition Distillers Products. In 1999, Ethanol Products was formed to market ethanol and carbon dioxide.

Twenty-three operating ethanol plants with a combined production capacity of over 1.1 billion gallons have been designed and built by POET. An additional five plants totaling 375 million gallons were under construction or development in December 2007.

POET retains an equity interest of 20-25 percent in its partners' plants. With its engineering and construction capabilities, ownership and management of partner plants, as well as its ethanol and distillers grains marketing services, POET has pioneered the "engineer/builder-owned" business model.

■ The "Franchise" Model

This is not a vertically integrated model, but rather is characterized by a dependence on third-party service providers to link the firm to its supply chain. The plant is a "cookie-cutter" facility designed and built by one of the major engineering firms (consortiums), and its production process is monitored remotely by the builder.

Third-party service providers are depended upon to procure feedstock (grain or oil) and to market biofuels and co-products. New operations under this model are generally required by their financial institution(s) to enter into long-term agreements with these service providers. In turn, the service providers might invest a modest amount of capital in the facility.

ASAlliances Biofuels LLC (ASA) was formed in 2004 by Americas Strategic Alliances LLC, a firm specializing in merchant banking and investments. ASA's business plan combines top-tier service providers with sophisticated financial partners. Each facility is to be built by Fagen Inc. and located adjacent to an existing Cargill Inc. grain elevator.

ASA began construction on two planned ethanol facilities in 2006, each with a capacity of 110 million gallons annually, in Albion, Neb., and Bloomingburg, Ohio. Construction began on a third facility in Linden, Indiana in 2007.

Cargill Inc. is contracted to provide corn and natural gas procurement services and ethanol and distillers grains marketing and transportation services. United Bio Energy Management LLC will provide operational and maintenance support.

In addition to negotiating contracts with the construction, grain supply, product off-take and facilities management firms, ASA put together the group of equity backers for the three facilities and obtained the required debt financing. A group of private equity firms comprised of American Capital Strategies Ltd., Laminar Direct Capital, L.P. (a member of the D.E. Shaw group), U.S. Renewables Group LLC and Midwest First Financial Inc., provided a significant portion of the equity and all

of the subordinated debt to ASAlliances Biofuels. Challenger Capital Group Ltd., a Dallas-based, full-service investment bank, secured $148 million in equity and subordinate debt.

In September 2007, VeraSun Energy Corp. announced plans to acquire the three ethanol plants from ASAlliances Biofuels LLC for $725 million. The acquisition is expected to increase VeraSun's total production capacity to approximately 1 billion gallons by the end of 2008.

In a sense, the "farmer-owned" and "engineer/builder-owned" business models can be viewed as variations of the "franchise" model. However, they also have elements of vertical integration that differentiate them from the pure "franchise" model. Farmer-owned operations are linked to the farmer segment of the supply chain, and in some cases there is integration with a grain elevator. This arrangement can reduce, but not eliminate, the need for a feedstock supply agreement for ethanol operations.

Third-party marketing organizations

The advent of third-party marketing organizations is an important development in the industry and a key component of certain business models, especially the "franchise" model. As of December 2007, there were 120 companies owning 134 ethanol facilities in operation, with 66 facilities under construction.

Besides being costly for each of these facilities to have internal sales staff for ethanol and distillers grains (the main co-product of dry-mill ethanol production), it would be particularly inefficient for fuel blenders to have to purchase ethanol from 100 or so different firms. Moreover, rail carriers favor unit train shipments of about 100 cars and a limited number of origin and destination points (preferably one of each). These preferences are reflected in their rate structures.

Until recently, it was necessary for a company to have a minimum of 100 million gallons of annual production to justify having an internal sales staff. However, given the proliferation of individual plants of that size, the minimum size has increased. Although there is no set rule, operations producing an aggregated 300 million gallons annually are more likely to use an internal sales staff. However, virtually all new entrants into the industry are encouraged by their lenders and debt holders to use a third-party marketing company, at least until they've gained sufficient industry experience.

VeraSun Energy Corp. owns eight plants with 560 million gallons of annual production, and has an additional 330 million gallons of capacity under construction.

At press deadline for this article (in early December), VeraSun had recently announced a proposed purchase of U.S. BioEnergy Corp. of Inver Heights, Minn., which would combine the nation's No. 3 and No. 4 ethanol producers into one company. The new VeraSun would have about 1.6 billion gallons of annual production at nine existing plants, with seven more under construction.

The deal was expected to be completed by March of 2008. If completed, the combined VeraSun-U.S. BioEnergy would surpass both ADM and POET in production. VeraSun recently transitioned to market its own ethanol, a service which had been done by Aventine Renewable Energy.

CHS Inc., the nation's leading farmer-owned energy and grain-based foods company, had owned about 20 percent of U.S. BioEnergy. If the merger is approved, it will own about 8 percent of VeraSun.

The CHS board of directors voted in favor of the VeraSun merger. CHS has marketed ethanol-blended fuels for more than 25 years and currently is one of the nation's largest suppliers of blended fuel products, which it distributes through 64 terminals.

Cellulosic ethanol applications

With the advent of cellulosic ethanol in the coming years, the issues of cost, legal structures and management are expected to become even more acute. Capital expenditures per gallon of capacity for cellulosic plants are estimated to be at least three times those for a corn-based plant. Between the total cost of a facility and obtaining the rights to use cellulosic ethanol technology, it is possible that only large corporations and private equity funds have the financial resources to provide the equity for such ventures, especially given the associated risk.

Given the importance of intellectual property in cellulosic ethanol and the fact that some of the main engineering companies serving the corn-based ethanol industry are also devoting resources to cellulosic ethanol, the engineer/builder-owned business model are likely to rise in prominence.

Collection and storage systems have yet to be established for crop-based feedstocks, although central milling locations exist for some forest and paper products. Given the scale of the investments and the role of intellectual property in cellulosic ethanol, it is possible that the farmer-owned business model will struggle to be relevant in the new industry. However, farmers will still be the main source of cellulosic feedstock. A hybrid business model could be developed to bring feedstock producers into the ownership structure.

The Broin/POET system of partnering with farmers and other rural investors seems to be adaptable for this purpose of tying together capital, intellectual property and feedstock. But the feedstock supply linkage will need to be enhanced. Given the legal and management issues discussed above, it seems imperative to ensure that any necessary modifications to legal structures and management systems be put in place during the next few years if farmers and other rural investors are to

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participate fully in the cellulosic ethanol industry of the future.

Business models are likely to become even more complex with the advent of cellulosic ethanol. For while corn is the predominant feedstock for the ethanol industry of today, a variety of feedstocks — corn, agricultural wastes, dedicated energy crops such as switchgrass and miscanthus, forestry products and others — are expected to be used by the cellulosic ethanol industry of tomorrow. The feedstock producers of tomorrow are, therefore, likely to be much more than row crop farmers. The "farmer-owned" business model will have to expand to embrace these new producers.

With the advent of biorefineries, the number and specialization of co-products should multiply and require a more diverse and complicated mix of third party marketing firms. In the case of some products with highly technical applications, the use of specialized marketing firms or long-term off-take agreements will be necessary because of the extraordinary expense of a facility having internal staff to perform such a highly specialized and technical sales function.

It's quite likely that more business models will be created by the advent of cellulosic ethanol. And we can expect them to be even more complex than today's business models. ■

Using the 'extra-value index' to measure agricultural cooperative performance

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the other types of cooperatives generated positive extra value in the second time period.

Five cooperatives showed consistent, strong performance — generating extra value with a 10 percent risk premium added to the basic charge for equity capital in both time periods (category V). Three of these high-performers were dairy cooperatives.

Furthermore, except for farm supply cooperatives, cooperatives of each type were found in the highest performance categories, IV and V, in 2000-04. This indicates that a range of agricultural cooperatives are capable of performing admirably, regardless of the product they may handle.

On the other hand, with the exception of cotton cooperatives, at least one cooperative of each type failed to generate sufficient value to cover a basic charge for the use of their members' equity. However, fewer cooperatives of each type (except for farm supply cooperatives) lost value in the second time period than in the first. In fact, farm supply cooperatives were the only type where a majority dropped in performance category between 1992-96 and 2000-04.

Group average extra value index

The simple average of the individual cooperatives' performances is shown in Table 2. The 65 cooperatives in the study averaged positive extra value in both time periods at the basic plus 5 percent rate, a category IV performance. For 2000-04, this group of agricultural cooperatives created 2.3 cents in extra value for every dollar of operating capital expended, on average, when a charge for equity capital with a 5-percent risk premium over the basic interest rate was applied.

However, if members' risk premium was 10 percent, the 65 cooperatives, on average, fell short of being able to pay member-producers this premium by 1 cent for each dollar of operating capital used.

Grouping cooperatives according to their main product showed a range of performance. Cotton cooperatives, on average, outperformed the other types. They generated positive extra value, with a 10-point risk premium charged for equity (performance category V) in both time periods. As a group, dairy cooperatives performed almost as well, but they dropped to performance category IV for 2000-04, missing members' expectations by an average of just 0.8 cent per dollar of operating capital when equity was charged a 10 percent risk premium over the basic rate.

The other five types of cooperatives all performed at category III for 2000-04, averaging positive extra value when charged a basic rate for their use of equity capital.

The averages obscure the fact that performances of individual cooperatives of the same type often varied widely. For example, at the basic plus 10 percent rate, four of the 16 dairy cooperatives ranked in the top 10 of the 65 cooperatives in 2000-04.

At the same time, a dairy cooperative showed the largest drop in rank between the two time periods among the 65 cooperatives. Another dairy cooperative was among the bottom 10 in rank for 2000-04. Similarly, of the three cotton cooperatives represented in the sample, two were in the top 10 in 2000-04 while the third cotton cooperative showed the second largest drop in rank of all 65 cooperatives.

The highest and lowest ranking cooperatives were both fruit and vegetable co-ops. Likewise, there was one grain cooperative in the top 10 for 2000-04, with two grain cooperatives ranking in the bottom 10.

Conclusions

The results of this extra-value analysis show that while all the cooperatives operated in the same general economic conditions of each time period, some saw their performance improve, while other cooperatives' performances worsened between the two periods. However, at least one of each type of cooperative (with the exception of sugar cooperatives) in at least one of the two five-year time periods considered, was